NEWS SCIENCE NEWS

OVERCOMING INERTIA FOR FASTER-THAN-LIGHT PROPULSION

by Tony Cuthbert © February 2001

This subject is controversial, as it entails additions to the laws of physics as we understand them. However, I stress that they are additions. I am not challenging current understanding.

I have spoken to a number of high-level people, some of them highly sceptical of this hypothesis. However, following close inspection of the data, these same academics and engineers have now become supportive—or at least to the point that they consider the project has merit.

I am grateful to BAE Systems, DERA (the Defence Evaluation and Research Agency) and a number of universities for their assistance in my work. Indeed, BAE Systems has provided some cash support and technical help, and DERA has provided a research aircraft (a BAC 111).

To summarise this project:

1. A device has been built and has performed well on a pendulum, water, wheels and an air table.
2. Strain gauge graphs have been plotted.
3. A zero-gravity aircraft has been scheduled for in-flight testing.
4. A high-level, solid-state experiment has been devised and discussed, involving lasers and high-speed circuitry.

The device as it now stands may be capable of propelling a satellite or enabling on-orbit station-keeping to be performed without the use of fuel. Taken to its more advanced stage, the concept may be applicable to spacecraft propulsion.

However, despite all the experimental models and circumstantial evidence at this point, the concept is still just an hypothesis. The object of this paper is to start a debate as to whether it is correct or not.

I have completed many hundreds of tests of many different models including, on one occasion, a solid-state experiment. At the very least, I believe I have a device that is ready to be attached to a satellite and which will prolong its life by four or five years, thus representing a value of some £200,000 per satellite. As there are hundreds of such, and many more to be launched, this alone demonstrates the value of pursuing this project. Surely DERA would not lend aircraft nor would BAE Systems provide support unless they thought there was a reasonable chance of success.

The Inertia Principle

All matter creates its own inertia. To explain the principle of inertia, it is useful to imagine a system where a single electron orbits a single hydrogen nucleus, and, using a classical model for the atom, imagine that the electron orbits in a circular motion at a constant angular velocity when in equilibrium, i.e., at a constant energy state (figure 1a).

Suppose an impulse is applied to the above system (figure 1b), lasting the same time as one complete electron orbit. During this time interval, for one half of the period the force is in the same direction as the moving electron, and for the other half of the period the force is opposite to the direction of the moving electron. Therefore, for one half of the period, work is done against the centrifugal force of the electron's orbit, as it is moving in the opposite direction to the applied force. It is the opposing half-orbit which causes inertia.

Models and Analogies

For the following explanations, it is useful to use a very simple analogy of the electron as a small ball-bearing connected to a much larger sphere, the nucleus, via an imaginary elastic band of certain length and stiffness. As any two interacting particles (for example, a stripped ion with no electrons, protons and neutrons, sub-atomic particles, etc.) produce the effect we call inertia, the principle is still valid for more advanced models, such as quantum physics, etc.

The following explanation shows that inertia, gravity and magnetic forces are all one and the same—just different aspects of the same phenomenon. Figure 2 shows a free hydrogen atom with an electron in a symmetrical orbit. The electron orbits the atom at a given energy level and angular velocity (radius and speed). In this analogy, the large sphere represents the nucleus, the elastic band represents the forces that keep the electron in position, and the small ball- bearing represents the electron. For this explanation, let us assume that conditions are in free space.

Imagine a solid mass of hydrogen called "Mass 1". Suppose a magnetic resonance field is applied to Mass 1 in order to cause all the electrons to become synchronised with each other. If Mass 1 is accelerated from stationary to 10 m/s, then the inertia

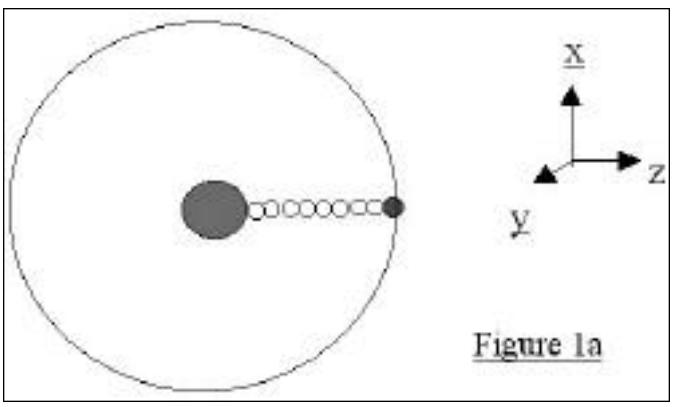


Figure 1a

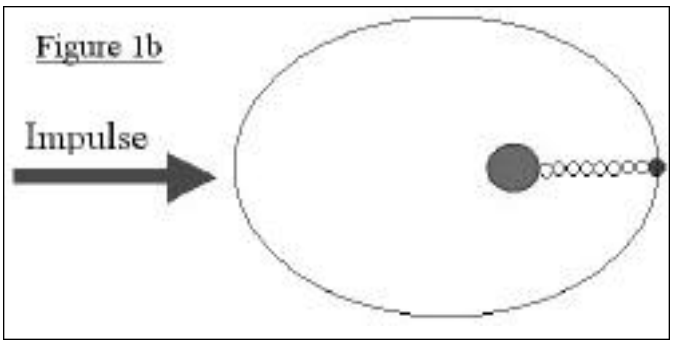


Figure 1b

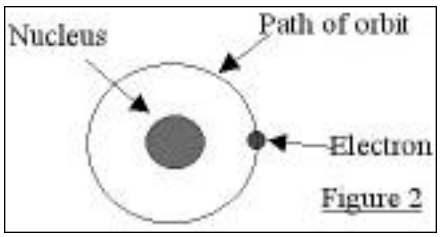


Figure 2

effect can be observed. Once the velocity reaches 10 m/s, it is held constant. There will be no inertia effect until the velocity is increased from 10 m/s to 20m/s, i.e., the mass accelerates. Thus, the inertia effects are only observed during acceleration.

Elliptical Distortion and Electron Lag

Now, observe the effects on the extracted single atom and electron analogous to figure 3. The large sphere, representing the nucleus, accelerates in the real world. Consequently, as the sphere moves, the elastic band stretches and the ball-bearing is displaced a further distance from the nucleus. The band continues to be stretched until the acceleration is cancelled, caused by the elastic band pulling the ball-bearing back into a stable position.

On the electron level, when the acceleration occurs the electron's orbit becomes distorted into an elliptical plane. The orbit becomes "lop-sided", creating an out-of-balance force in one direction (figure 4). For the duration of the applied acceleration, the biased direction is opposite to that of the applied force. Once the acceleration stops, the electron catches up with the atom and the system returns to equilibrium.

The elliptical distortion created in this manner is the force we call *inertia*. It is the out-of-balance force which tries to take the atom in the opposite direction to the applied force. This could be labelled as *electron lag.*

The Gravity Limit

This principle can also be extended to the theory of gravity. The electrons in a gravity field are defined as any other particle. Referring to figure 5, imagine that the electrons are rotating around the x-axis and that gravity is acting along the y-axis. The force of gravity acting on the electron causes it to increase infinitesimally in velocity when swinging down towards Earth, and to decrease infinitesimally in velocity when rotating up past the nucleus. This causes the bias of momentum in the downward direction and hence causes objects to move towards the larger mass, i.e., the Earth. This effect could be labelled as the *gravity limit.*

Therefore, in the gravity field the elliptical orbit of the electron is being distorted by two components. If the system accelerates, the electrons can be distorted horizontally with respect to adjacent particles (electron lag). Also due to the force of gravity, electrons are distorted downwards (gravity limit). The electron orbit therefore resides as a component of the two distortions.

Electron Lead Time

What would happen if it were possible to create an elliptical out-of-balance force opposite to that above? Not only would inertia be cancelled, but also a bias, opposite to the sign of inertia, would exist. This could be called *electron lead time.*

Take a high-energy system such as in figure 2, where initially the angular velocity is constant and the electron orbit is circular. Now imagine the system is suddenly removed from a state of equilibrium, not by accelerating the nucleus but by exciting the electron. This causes the electron to speed up and, providing it doesn't leave orbit, the path of the electron becomes much more elliptical (figure 6). If the electron has enough momentum, it can slightly displace the nucleus.

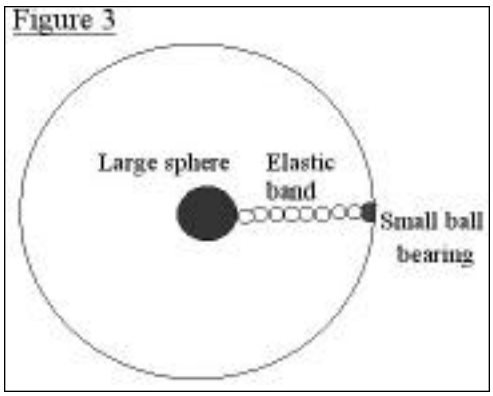


Figure 3

This can be imagined as the ball-bearing originally swinging around the large sphere on the end of the elastic band. Suddenly the ball-bearing is hit in the direction it is going, effectively giving it a boost. If the ball-bearing can swing out at such a high velocity past the large sphere without the band snapping, it pulls the sphere along in the same direction it is going. As the ball-bearing swings back the other way, the sphere moves back towards its original position but does not have enough momentum to reach it. Consequently, the nucleus is displaced from its original position.

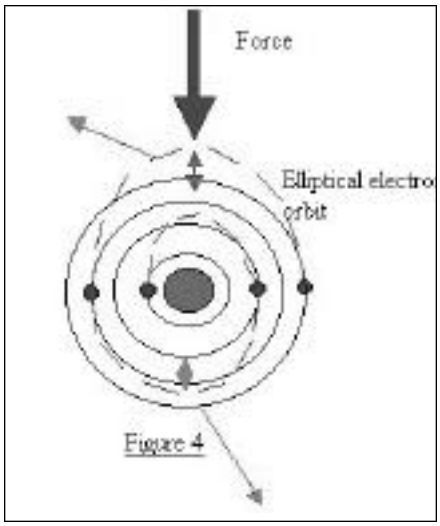


Figure 4

As the electron is in this "biased" orbit, it takes time for the system to return to equilibrium. It can take the electron a number of revolutions before reaching stability, and this increases the chance of having an overshoot in the opposite direction. However, the following overshoot is always less severe than the previous overshoot, as the system is uniformly becoming more stable. However, if this applied force is pulsed in phase with the direction of the electron travel, then this electron lead time can be sustained over a longer period of time, producing an amplified effect of the momentum biasing.

Consider that this electron lead-time is then applied to an accelerating system. When the nucleus starts to accelerate, the electron is left behind and its orbit ellipses in the direction opposite to the forward motion. Then simultaneously apply this pulsed boost to the electron, and the electron can at least accelerate at the same rate as the nucleus. This alone cancels the effects of inertia. However, if this pulse biases the electron ellipse in the same direction as travel, then the object moves much more easily.

As an electron moves near to the speed

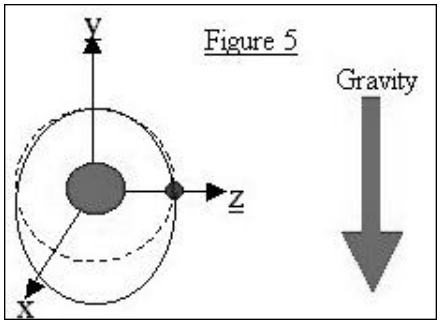


Figure 5

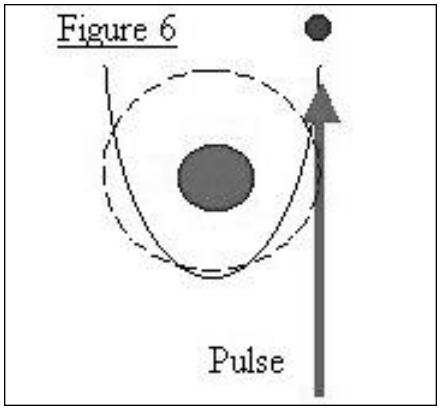
of light, any force generated in the opposite sign to inertia then implies the following: during the time interval when the pulse is influencing the electron orbit, the speed is that of light or above. (See high-level experiment in appendix on website.)

Application of Principles

In conclusion, it is proposed that the effect of inertia is a direct result of the electron orbit lagging behind the atomic nucleus when accelerating in a certain direction. By overcoming this electron lag, the effect of inertia can be eradicated, thus allowing acceleration at exceptionally high velocities with minimal power requirements.

It is proposed that this bias of electron orbits can be exploited to promote motion in any direction, and that gravity uses this same mechanism to attract masses, thus suggesting that the force of gravity is nothing other than an out-of-balance "centrifugal force" acting on the atomic level.

It is also suggested that the field of a magnet, although affecting different materials to different degrees, is similar to that of a very localised gravity field. The power of a magnet is derived from the characteristics of the electron's orbits themselves, and molecular structure within a magnet allows it to retain its magnetic capability indefinitely. Magnets appear to have no effect on non-ferrous materials, but in fact they do react, albeit in some cases to a very limited degree. If a strong enough field is applied to any material, it can be made to levitate.



A fundamental question remains: is it possible to increase and control this effect to exploit the system from a technical point of view? By stimulating the particles when they are in phase with the direction of travel, it is possible to levitate or propel any material and, incidentally, get rid of acceleration effects. As the propulsion is driven from the atomic level in any individual atom on board the vehicle, the force affects each and every atom so no acceleration effects will be experienced.

Einstein formulated his famous $E = mc^2$ theory based on an *inertia constant*. Put simply, his equation says that to accelerate a 1-ton mass to light speed, infinite energy would be required. Considering the principles above, it could be possible to accelerate the 1-ton mass to light speed on a power source as small as a flashlight battery.

In closing, if this article raises your interest, please contact me so I may brief you in greater depth or provide a more detailed file. If you require references from academics who support further investigation into my work, I am happy to provide these. ∞

Editor's Note:
Tony Cuthbert and his inventions were featured in an article by Tony Edwards in NEXUS 7/03. Tony can be contacted by telephone on +44 (0)1686 670756, by e-mail on tony@cuthbert-physics.com, or via his website, http://www.cuthbert-physics.com/sussex.html.

THE TRANSISTOR ENIGMA

by Robert Adams, DSc

Who Really "Invented" the Transistor?

Having searched all the encyclopaedias and authoritative scientific and technical texts in relation to the history of the transistor, I was struck by the inconsistencies of the different historical records. Every record casts doubt by omission of salient data and credits as to who actually invented the transistor. The history is ambiguous and contradictory.

The story surrounds the mighty crystal, and, while it has its roots in the early 1920s, most of the narrative centres around 1947–48 and the claim that a group of scientists at Bell Laboratories "invented" the "transistor". (Never mind that the word "transistor" had not then been coined!)

In my search, I referred to the *Dictionary of Radio and Television Terms* (UK, 1941) by Ralph Stranger, an international authority on electronic terminology, and also *The Outline of Wireless* (UK, 1932–37). I also referred to *Practical Radio Communication* by Nilson and Hornung (UK, 1943); *Receiver Circuitry and Operation* by Alfred A. Ghiradi (USA, 1951–56); and *The Modern Electrical Engineer* by Caxton (UK, 1927–1951). The term "transistor" does not exist in any of the authoritative references published in the few years after 1947–48—evidence that it was slow to enter the technical language, and calling into question the entire recorded history of the device and its development.

The *D. Van Nostrand Scientific Encyclopedia* (Canada, 1947, 1958) has an extensive section on transistors, including many descriptive drawings of physical structures and circuits, but no mention of the history or any credits.

Charles Susskind of the University of California in *Encyclopedia of Electronics* (USA, 1962, p. 881), who *does* use the term "transistor", states: "The junction transistor was invented in 1948 by Shockley from a theoretical consideration of the electronic process taking place at a PN junction in semiconductors." There's no mention of the 1956 Nobel Prize.

Colliers Encyclopedia (USA, 1972, vol. 22, p. 408) notes: "This development is built on the work of Bell Telephone Laboratories' scientists, such as John Bardeen and Walter H. Brattain, who invented the transistor, and William Shockley, who both directed the Laboratories' research program in semiconductors and outlined many of the physical theories that led to a basic understanding of semiconductor materials and their behaviour. Their assault on the semiconductor problem was launched from a base of contributions made by the Laboratories' scientists and engineers, especially Russell S. Ohl, Jack H. Scaff and Henry C. Theuerer, whose pioneering work on silicon made a new class of semiconductors available to physicists. Bardeen, Shockley and Brattain were jointly awarded the 1956 Nobel Prize in Physics for their pioneering work on the transistor."

According to *Funk and Wagnalls Encyclopedia* (USA, 1973, book 23, p. 8617): "The transistor was developed at Bell Laboratories by the American physicists William Shockley, Walter Brattain, John Bardeen. Shockley is noted as the initiator and director of the research program in semi-conducting materials which led to the discovery of this group of devices; his associates Brattain and Bardeen are credited with the invention of an important type of transistor." Note the word "developed",

not "invented". There's no mention of their 1956 Nobel Prize in Physics.

Encyclopaedia Britannica (UK, 1973) notes that the Nobel Prize was awarded to William Shockley, Dr Bardeen and Dr Brattain collectively in 1956, but gives no other comment or credits.

The reference to transistors in the *Macmillan Encyclopedia* (USA, 1983–1996) reads: "They were first developed in 1948 by Shockley and his co-workers at Bell Telephone Laboratories, USA." Again, note the word "developed", not "invented". There are no further credits, nor mention of the Nobel Prize.

Controversial Claims

Enter Jack Shulman, President of American Computer Company (ACC), who has claimed in a talk published in NEXUS that the transistor came from a US Government project [see "Reverse Engineering Roswell UFO Technology" in 6/04, and Twilight Zone 5/02]. Yet supposedly it was the culmination of the combined effort of at least six people: Shockley, Bardeen, Brattain, Ohl, Scaff and Theuerer.

Shulman mentioned AT&T's claim that Shockley suddenly noticed the rectifier had "unusual propensities"—but these "propensities" have been known since the days of crystal sets, well over 100 years ago. Shockley discovered nothing, for the very reason that the "unusual propensities" referred to are intrinsic to the nature of a crystal—and it is because of this fact that crystals are rectifiers! (Refer also to the Peltier effect, so named after Jean Peltier, 1785–1845.) Since when did the propensities of a single crystal rectifier become an invention or represent a transistor?

As for AT&T's claim that Drs Bardeen and Brattain both referred to a man named Case who was talking about transistors in 1931, how can this be when the word "transistor" hadn't yet entered the lexicon?

However, Jack Shulman seems to have sided with Jack Morton, the administrative head of the transistor project at AT&T at the time, in calling Shockley a "witless buffoon" and claiming "There's no way he could have invented the transistor".

Shulman mentioned in his talk that ACC had speculated on its website: "Did AT&T receive stolen alien technologies from the US Government in 1947 and thereby invent the transistor, the laser, the integrated circuit...different technologies?"

So all this begs the question: who (on planet Earth) is/are the rightful and original inventor(s) of the transistor? And, for that matter, who is/are the rightful recipient(s) of the Nobel Prize?

Crystal Circuitry Experiments

Over many years, I have thoroughly researched the early experimental and theoretical work carried out on crystals and those people involved in the study of the electrical science of cystallography during the years 1920 to 1950. In fact, I have searched back over 100 years in various encyclopaedias and scientific texts for anybody having recorded any similar development or invention pertaining to the birth of the transistor, and can only find just one other person: the Russian scientist O. Lossev, of Nijni, Novgorod.

Lossev made the monumental announcement that "a crystal rectifier/detector can also be used for generating and amplifying purposes (are we not coming fast to an all-crystal multi-stage receiver?)". This is quoted in the UK journal *Wireless World*, no. 271, 22 October 1924.

However, having carried out experimental tests with crystals before publishing his findings, Lossev did not in any way make any claim as to having invented anything. Also, there is no evidence in his theoretical intuitive announcement that pertains to his having duplicated any crystal circuitry—such as I had perceived and accomplished in the later year of 1933.

The Adams Solid-State Amplifier

In my youth, I was profoundly interested in the wonders of natural crystals and permanent magnets. My earliest days of interest surrounded crystals at first. I was so fascinated with them that my interest very quickly reached into the realm of the aether and, in turn, into broadcasting, general communications and ferromagnetics.

It was in late December 1929 that I started experimental work with natural crystals in various tuning and selectivity circuit combinations in the many crystal sets I developed. I spent much time over the design and construction of vacuum tube amplifiers, and discovered experimentally the similarity between crystallography and vacuum tube technology. I conceived the application of crystal compatibility in relation to crystal amplification of radiofrequency signals, and achieved considerable experimental success. All this, and more, before the time of the Bell boys. (Speaking of crystallography and vacuum tubes, Henry Moray did pioneering work in the early 1930s on the use of crystal plates in vacuum tubes for his Tesla radiant energy device.)

In 1933, I came up with a method for amplifying the remarkable properties of crystals. Connecting two similar crystals together physically and utilising the junction as the base of the module (as would apply to the grid of a vacuum tube amplifier), I applied a low battery bias voltage to each crystal in their required polarity direction. (Incidentally, by this time I had built a number of class-A triode vacuum tube amplifiers.) Connections were achieved with cat's whiskers supported by the then available vertical cantilever-style supports.

The result was a spectacular solid-state amplifying module with immense amplification properties. The output was fed into an old, inefficient, balanced armature speaker.

In 1933, at thirteen years of age, I had no idea of the enormity of what I had achieved. There before me was a solid-state power amplifier module capable of massive power gain—something which is now known as a "transistor". It did not take me thousands and thousands of man-hours. I did not need a team of adult assistants. It took just five days.

It was my curiosity, not a "chance discovery", which led me into the realm of invention. Little did I know it then, but this little module was the forerunner of what I set out to achieve at a later date for reducing the gross mass of the then current-receiving apparatus. ∞

About the Author:

Robert Adams, DSc, FNZEI, MS &MN (UK), built his first crystal set at the age of nine, in 1929, the solid-state amplifier in 1933, a loudspeaker intercom phone system in 1963, and a plug-in, solid-state printed circuit board that same year. Dr Adams has had an illustrious engineering career, designing systems for radio and television broadcasting and aircraft communications in New Zealand. His theories on the aether led to his invention of the Adams Pulsed Electric Motor Generator (see NEXUS 2/11, 8/01) and a number of other advanced developments since.

The enigma of the "true history" of the transistor is discussed in Dr Adams's *Applied Modern 20th Century Aether Science, Special Update 2001* (second edition). An expanded article (from which this one is extracted) is to be posted on Dr Adams's website, www.aethmogen.com.

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